



Zero Waste Update

June 2005, Issue 45

Mission Statement: "To encourage and motivate all sectors of New Zealand society to work towards a target of zero waste."

Safe way to recycle fluorescents

A national 'zero to landfill' collection and recycling service has started for all forms of mercury lamps, particularly fluorescent tubes.

Until now, New Zealand has had no means of disposing of this hazardous waste in an environmentally friendly way.

Auckland company Medi-Chem Waste Services, is running the service in conjunction with Eco-Cycle Industries in Australia.

The spent lamps are collected and crushed using the latest technology to contain the mercury, and then shipped across the Tasman for recycling at Eco-cycle in Melbourne, says Medi-Chem director, Lincoln Falconer.

Medi-Chem's system collects and recycles mercury waste from all types of fluorescent tubes and lamps with technology that separates the different materials and recovers the mercury.

The first stage of the process at the company's East Tamaki operation, is done by crushing and dry separation of the hazardous waste while the second stage involves dry separation and distillation the mercury.

The technology meets high environmental and safety standards and handles many mercury bearing products such as halogen and fluorescent tubes and lamps

(including metal halides), batteries, switches, and thermometers.

The distiller can also process medical and dental waste, filters, sludge, catalysts, powders, military waste and other mercury bearing metals and production wastes.

Marketable by-products from a fluorescent tube include; aluminium from the ends which is separated and recycled

into cast products such as ingots used in foundaries; glass from the tubes and lamps is recycled into the glass wool used to insulate homes; mercury is distilled from separated powders and re-used in dental amalgam, and phosphor powder is used in the manufacture of fertiliser for agriculture.

Medi-Chem will soon be able to offer its collection service nationwide, and already operates trucks that cover most of the North and South Islands.

The company supplies its larger corporate clients with cardboard drums that will hold 100-200 fluorescent tubes per drum. When the drums are full, the client calls an 0800 number for pickup to processing at Medi-Chem's Auckland base.

Pre-pay boxes for smaller companies with fewer tubes are also available, and these can be sent by courier or collected by Medi-Chem. Mercury lighting is about 3-4 times more efficient than non-mercury lamps, and nearly all energy efficient

lighting contains mercury, says Mr Falconer.

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Medi-Chem's Brigitte Petrie and Linclon Falconer with the cardboard barrels for fluorescent tube collection.

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South Island Zero Waste Bus Tour visited the Raikaia Resource Recovery Centre where volunteers (below) showed them recycling in operation.



Councillors gain from Zero Waste tours

The three Zero Waste bus tours held in New Zealand recently were a successful learning experience for the participants.

The three tours - Southern North Island in March, South Island in April, and Northern North Island in May - were held by the Zero Waste New Zealand Trust.

These followed on from the success of the first Zero Waste Bus Tour in the South Island in March 2004. The tours were part-sponsored by the Ministry for the Environment. Local body councillors and council officers, made up the majority of participants as well as business people, community groups, and representatives from the Ministry for the Environment.

Most people did the whole tour, but several councillors were only available for one or two days, and for the last tour, one-day trips were also promoted.

Feedback has been positive and includes comments such as "The challenge now is to change the current situation" ... "I feel much better informed as a result" ... "The tour assists in reassuring what direction I am taking is generally right" and "A great experience - I'm really glad I took the time to do this. I'm fired up to make some real change and improvement".

The bus tours involved a full day's itinerary for each of the four days with visits to community and council operated resource recovery centres and transfer stations, re-use shops, green waste composting sites, worm farms, secondary industries and landfills.

Considerable work went into ensure the optimum range of sites was visited. It is a commentary on the emerging nature of this industry that excellent examples are wide spread.

Each evening the bus tour group met local council and community representatives at dinner and for presentations on local zero waste issues.

Considerable discussion took place on waste issues, both during the day and at the evening meetings.

Responses to the post-tour questionnaires indicated that all participants had gained knowledge, ideas and inspiration for zero waste initiatives in their communities from the trip. (Full details of the Zero Waste Bus Tours are available on the web at www.zerowaste.co.nz)



Participants in the Southern North Island Zero Waste Bus Tour discuss composting with inventor Donald Campbell at Palmerston North. (See story page 5)

Potential for biofuels from waste in New Zealand

Biofuels from waste are part of a huge potential for future renewable energy production in New Zealand.

Firewood and forestry waste are the most common biofuels here, producing about 32PJ per year in 1997 which was expected to increase to about 58PJ by 2010. (SNZER.) This will be about eight per cent of our total primary energy needs.

This is useful, but modest compared to the enormous potential of special fuel crops that produce bio-ethanol - the dominant biofuel in America and Europe.

Ethanol for transport fuels is most commonly produced from sugar crops by fermentation and distillation.

Blends of up to 10 percent ethanol in petrol (E10) can be used in modern vehicles without any appreciable changes in performance.

Studies here have shown that there is the potential to produce enough maize and sugar beet to replace all petrol in New Zealand many times over with an E10 blend, although this would require substantial changes to farming patterns. One million hectares of plantation fuel crops would yield about 540PJ or about 85 per cent of New Zealand's primary energy supply needs.

Although 14 percent of our land area (4 million ha) is physically able to support crops or horticulture, standing crops of all sorts (e.g. arable grain and fodder crops, market gardens, orchards and vineyards) cover less than 2 percent of this area.

Bio-ethanol is the most popular alternative fuel around the world. In America more than 60 ethanol production facilities are located in over twenty different states. Feedstocks include corn, maize starch, whey, milo, potato waste, cheese whey, brewery waste, beverage wastes and waste gluten. Ethanol there is most commonly blended in petrol and the E10 is offered as a cheaper fuel at many service stations.

In Brazil an E22 petrol blend (up to 22 percent ethanol) is made from sugar beet for vehicles specially designed to use the fuel, and Canada is trialling a bio-ethanol blend with ethanol made from straw. European countries allow up to 5 percent ethanol in petrol.

Australia has an active programme supporting bio-ethanol where currently splash blending into specification grade petrol is permitted. China has the world's largest ethanol plant and is already planning a second.

Ethanol can also be produced from woody biomass, but at a significantly greater cost. Currently New Zealand produces ethanol from whey, a by-product in the dairy industry.

Other biofuels are gaining interest around the world and in New Zealand, as the technology to collect and use biogas improves and develops. One of the most recent developments in New Zealand is a pilot plant for the production of diesel from waste at Waikiwi on the West Coast.

Westland Regional Councils and three West Coast councils are considering a proposal to commission the multi-million dollar plant that was developed by two South Island engineers.

The plant can be fed anything from tyres to green waste and produces diesel that can be used to fuel cars, trucks and industry. If it gets the go-ahead the plant could employ

more than 200 people and see the Coast importing waste from around the South Island.

Biogas is collected and used on-site by some large farms, food-processing plants, and at several landfills in New Zealand. Landfills pipe the methane to a plant where it is used to generate a small amount of electricity that is either used locally or sent to the national grid.

Two current examples of successful biofuel use in New Zealand are an on-farm bio-digester that produces organic compost and electricity, and an organic waste fuel used to help generate power in two of the country's largest pulp and paper mills.



The ripper converts green waste to hog fuel

Hog fuel used at mills

Biofuel is one of the innovative ways that Waikato company Materials Processing Ltd, recycles waste products for its clients

A third of the fuel required for the boilers at Kawerau Pulp and Paper Mill is provided by wood waste material that is ground down and re-used as boiler fuel.

MPL, an award winning recycling company, recovers 95 per cent of the Kawerau mill's wood waste (about 10,000 cubic metres per month), that was previously going to an industrial landfill.

MPL's portable grinder, dubbed "the Ripper", converts the waste into fuel – chomping down on green waste, old wood pallets, waste paper reels and logs that are all shredded by the machine.

The Ripper reduces the material to a desired chip size which is blended with sawdust to create a biofuel called "hog" fuel Paper which cannot be recycled due to food or wax content can also be blended into this biofuel.

The machine not only grinds waste wood from the mill, but also from a sawmill and a tissue mill in the area. The local industrial landfill was also excavated and MPL reprocessed 60 per cent of the material being recovered there.

The same process is used to create hog fuel for the boilers at nearby Kinleith Pulp and Paper mill. The company also processes waste materials from other local mills, and wood waste from nearby businesses, reprocessing about 80,000 tons of material per year.

The mobile grinder plant operates throughout the Bay of Plenty region, blending a variety of materials to meet compost feed stock needs or bio fuel specifications.

Short term levy on clear glass

A proposed six-month voluntary levy on imported clear glass is a short-term solution that will help sustain glass collections.

The recently announced voluntary levy proposed by major glass users is intended to keep glass recycling on track to reach Packaging Accord targets. The levy would help support the cost of recovering glass around New Zealand, said Tony Nowell, board chairman of Packaging Accord 2004.

The majority of those involved have agreed that a levy be applied for the next six months to fund the shortfall in what recycling operators will be paid for collecting clear glass, he said. This applies to about 25 per cent of the 95,000 tonnes of glass recovered in New Zealand last year.

During this six month levy period, more work would be done to find a long term solution to recycling clear glass.

The next step for the board will be to present the proposal to local authorities and recycling operators, to work through

the detail with those who are instrumental in delivering our glass recovery service, he says.

"The Packaging Accord will continue to work with industry to find a sustainable long term solution to this issue and to bring all parties into such an agreement."

The levy proposal has been accepted by a significant majority of the glass packaging industry including ACI Glass, Sutton Group, Coca Cola Amatil, Lion Nathan, Foodstuffs, Progressive Enterprises, Frucor Beverages, Fosters Group, Endeavour Glass and DB Breweries.

"This is a first and important step to recognise that we all have a responsibility to manage the environmental impacts of the products which we make and sell, said Mr Nowell.

"It demonstrates companies working with each other to help find a solution to a very complex problem and to acknowledge efforts made by local councils, recycling operators and households to keep our country clean and green."

Glass sand study for Wellington beaches

Wellington's beaches may one day consist of crushed recycled glass instead of sand.

A report commissioned by Wellington City Council is investigating whether beaches such as Oriental Bay could use crushed recycled glass as a sand supplement. The sand could be used to help replace sand lost from beaches that have to be artificially replenished, says Bruce Geden, strategic projects manager for WCC.

Of the 17,600 cubic metres placed on Oriental Bay, about 200 cubic metres or just one per cent, has been lost.

Before recycled glass is introduced to the bay, the council needs to see if its' environmentally, technically, and financially feasible, he says.

Considerations included the impact of storms, the cost of processing the glass, the colour and density of the glass, and the ongoing availability of recycled glass in the Wellington region.

They also had to look at the perception of using finely crushed glass instead of sand.

Other beaches that could get an artificial glass top-up include Balena Bay and Hataitai Beach. Most other beaches in the region had a natural sand replenishment, whereas the three inner harbour beaches did not.

The process has been used before at Lake Hood in Ashburton by Wastebusters Trust Canterbury, and other locations around the world.

Bottle reuse best option say Greens

The proposed temporary voluntary recycling levy on glass packaging is welcomed by Green MP, Mike Ward.

The Packaging Accord's Board has announced that some glass bottle producers are to pay a voluntary levy on imported glass for the next six months. This will keep collections viable and fund work on a longer-term solution.

"Good on the Packaging Accord Board for taking this step and throwing a lifeline to the recycling industry," said Mr Ward, the Green Party's Waste-free spokesperson.

"The Board clearly recognises that the levy is a stop gap measure. We urge that it be permanent and compulsory and the first step towards the restoration of the old, but tried and trusted, container deposit system and a viable reuse scheme.

"While recycling is better than sending used packaging to landfills or converting glass to sand or aggregate, reuse has to be the preferred option," he said.

"We don't want to discourage people from recycling, it's a great 'green' thing that everyone can do every day.

"But it has to be put into perspective. Kerbside recycling of glass bottles is a mechanism by which ratepayers subsidise the profits of breweries, wineries and soft drink manufacturers.

"Instead of the producer taking responsibility for the ultimate fate of the packaging of their product, it falls back on local councils and communities to pay for collection and disposal.

"Ideally, people should be able to get money back on their bottles in the knowledge they will be refilled, preferably locally, not trucked back to Auckland and then put back through the energy-intensive process of turning them back into raw glass that is then reformed as new bottles," said Mr Ward.

"It makes better sense to design bottles for re-use, collect a deposit on them when purchased, and use the deposits and/or levies to recompense the customers and establish regional bottle collection centres and washing plants," he said.

Safe way to recycle fluorescents *(Continued from page 1)*

"While the environmental benefits of using mercury lighting are undeniable it is important that spent lamps are disposed of in a controlled manner (preferably recycled) to ensure that mercury is not released into the environment."

Lamps and other waste that contains mercury are defined as a hazardous waste (in the NZ Waste List) and the disposal of mercury to landfill is tightly regulated in terms of current Landfill Waste Acceptance Criteria (LWAC), he says.

"Very small amounts of mercury can contaminate drinking water and bio-accumulate in the food chain. The mercury from one fluorescent tube can pollute 20,000 litres of water beyond a safe level of drinking."

As an example, a single 4 ft fluorescent tube can contain between 2-40mg of mercury (which equates to approx. 10–200 mg/kg), which compares with the current LWAC of 0.2 mg/l on a TCLP basis. (TCLP is the Toxicity Characteristic Leaching Procedure and is a test used by NZ landfills - developed by the US-EPA - to check the leachate levels coming off landfilled hazardous wastes.)

Kitchen waste to compost

A compost machine that takes kitchen food waste and turns it into high quality compost is attracting attention from around the world.

The Ecoscience Composter, operating at the Awapuni Landfill in Palmerston North, was invented and built by Donald Campbell of Bark Research, and has now been successfully trialled.

He's already had interest in the design from a number of countries including Australia and Singapore.

The composter was developed with a \$20,000 grant from the New Zealand Zero Waste Trust and funds from the Palmerston North City Council.

It has the capacity to turn 10 cubic metres of raw kitchen waste into about two metres of rich compost each day. The waste food is put into a shredder and a bulking agent such as sawdust or wood chips is added. The process from kitchen waste to compost takes seven to ten days.

The plan is to use commercial kitchen waste for the composter, as most waste generated in the 400 commercial kitchens in Palmerston North is dumped in the landfill. This putrescible waste is a major contributor to methane in landfill gas which is a harmful greenhouse gas," says Palmerston North City Council water and waste services manager, Chris Pepper.

"The composter plays an important role in reducing the amount of kitchen waste deposited in the landfill, and will generate revenue from the sale of the compost."

"It benefits everyone to be involved in providing waste food for the composter," he says.

The council hopes to create a stand-alone business by processing the commercial kitchen waste into high quality compost. Some outlets are already sending their food waste to the composter and a list of others is waiting to get involved in the project. The compost has been branded as Organic Matters Premium Compost

Until recently there has been no processing option to remove the mercury from lamp waste for New Zealand and nearly all waste has been disposed in an environmentally unsound manner.

The company already has more than 30 large corporations, several universities and other tertiary institutions, local authorities and smaller companies, taking advantage of the mercury collection and recycling service.

Government departments are also looking at taking part in the scheme.

Schools are another important source of fluorescent tubes, and up until now most of their tubes have gone into skips on site, where there is always the potential for broken tubes to leach mercury, and mixed with rain, this can easily escape into the groundwater and stormwater, he says.

Medi-Chem is the only company in New Zealand currently offering a mercury recycling service - providing a safe mechanism for the disposal of a hazardous waste and environmentally friendly reuse of all waste by-products.

Call 0800-4FLUOROS for more information.

Glass sand research results look good for golf courses

New research results in the United Kingdom demonstrate that using a blend of processed sand (made from 100 per cent recycled glass) and conventional sand offers performance and environmental benefits and is closer to the traditional sand colour.

This is especially good news for greenkeepers who are reluctant to use processed sand due to its natural green colour.

To find the optimum colour and performance ratio, trials were undertaken by the Sports Turf Research Institute (STRI), on behalf of WRAP (the Waste & Resources Action Programme).

The trials compared different blends of conventional and processed sand and showed that the optimum ratio was a 50:50 blend.

This ratio maintained processed sand's performance advantages such as firmer underfoot conditions and reduced plugging of the ball, but also significantly reduced the green colouring.

This was the second trial carried out by the STRI. Earlier trials demonstrated that processed sand was ideal for use in a range of applications on the golf course, including bunker sand, divot repairs, and as top dressing.

WRAP intends to take the results from all the research carried out with the STRI and apply it in situ, working with several high profile clubs. One of these will expand their course constructing new greens, tees and bunkers using processed sand. Once mature, players will be able to experience play for the first time on a golf course constructed using processed sand.

'Shining example' takes Zero Waste Supreme Award

Top honours in this year's Zero Waste Awards went jointly to Wastebusters Trust Canterbury and Ashburton District Council.

The awards were made at the Zero Waste Conference in Kaikoura in April where Trust manager Sheryl Stivens and Council operations manager, Rob Rouse, accepted the award.

The Ashburton partnership also took the Best Zero Waste Partnership Award and individually they took out Best Zero Waste Community Education Programme (Wastebusters) and Zero Waste Local Authority of the Year.

"Wastebusters Trust Canterbury is a shining example of a community enterprise establishment," said Zero Waste Trust chief executive, Jo Knight. "They way they work in with their council is absolutely excellent and the award reflects that."

Another highlight of the awards night, was when local Kaikoura waste manager, John Ransley stepped up to accept the Zero Waste Co-ordinator of the Year award. John was a popular choice and retires later this year from his position with Innovative Waste Kaikoura.

Fonterra's Clandeboye processing plant near Temuka won the Zero Waste Partnership award with its waste diversion project in conjunction with FullCircle and EnviroWaste. The eco-efficiency project reduced waste to landfill from the Clandeboye site by 70 per cent, and saved the company thousands of dollars. The Best Recycled Product or Process award was won by Potatopak products from Blenheim.

Fonterra Clandeboye's process projects manager, Rob McCoid accepts the Best Zero Waste Partnership Award from Whalewatch Kaikoura's Terry Sonal.



The Supreme Zero Waste Award is presented to Sheryl Stivens and Rob Rouse from awards sponsor, Whalewatch Kaikoura's Terry Sonal.



Zero Waste Awards 2005

Award Judges: Ket Bradshaw, Peter Fredricsen, Geoff Hemm, Maureen Pugh, John Ransley,

Supreme Zero Waste Award
Wastebusters Trust Canterbury and Ashburton District Council.

Best Community Zero Waste Project (3 finalists)
Xtreme Waste

EERST Trust (Marty Hoffart and Bruce Trask)
Wastebusters Canterbury and the Ashburton DC

Winner: Wastebusters Canterbury and Ashburton DC

Zero Waste Co-ordinator of the Year
(3 finalists – John Ransley did not judge this category. He was nominated by another group.)

Kevin Cameron (Recycling Manager, Wastebusters Trust)

Anita Coghill (Education Manager, Wastebusters Trust)
John Ransley (Manager, Innovative Waste Kaikoura)

Winner: John Ransley

Zero Waste Local Authority of the Year

(2 finalists – Geoff Hemm did not judge in this category because of a close association with one of the entrants)

McKenzie District Council

Ashburton District Council

Winner: Ashburton District Council

Best Zero Waste Community Education Programme (3 finalists)

Junk to Funk (Waiheke Waste Resource Trust)

Xtreme Waste

Wastebusters Trust Canterbury

Winner: Wastebusters Trust Canterbury

Best Zero Waste Partnership (3 finalists)

Hokitika Lions Club

Fonterra Clandeboye

Ashburton District Council and Wastebusters Trust

Canterbury

Winner: Fonterra Clandeboye

Best Recycled Product or Process (1 finalist)

Winner: Potatopak New Zealand Ltd

Bylaw gives councils control of waste

Waitakere and North Shore City Councils are making local government history by proposing a waste by-law aimed at reducing the region's rubbish.

The new waste collection contract signed by two of New Zealand's largest cities is also a major step towards delivering on their "Zero Waste" policies.

Together with Rodney District Council, the councils are the first to seriously implement elements of central government's National Waste Strategy. Rodney District Council is participating in the waste by-law and may also join the waste collection initiative when their current contractual commitments expire next year.

Waitakere first publicly tabled the idea of collaborating with other councils for waste reduction in a 1999 document titled, "Your waste, whose responsibility," in an attempt to challenge the commercial monopoly of the Auckland waste market.

The council's recommendations progressed during a meeting in 2002 between Waitakere City mayor Bob Harvey and his North Shore counterpart, George Wood, where they discussed ways at achieving "Zero Waste" in Auckland.

"People often criticise local governments as highly bureaucratic," says Waitakere City Mayor Bob Harvey. "The new waste collection contract and regional bylaw clearly demonstrate the ability of the councils to work together toward a common goal that will achieve great efficiencies and benefit ratepayers - not to mention the benefits to the environment"

Of New Zealand's five major waste collection operators, Onyx Group Ltd emerged as the outstanding tender for the shared services contract, worth \$55 million over ten years. Waitakere's solid waste manager, Jon Roscoe, who is also project manager of the "shared services" initiative, says that Onyx "raised the bar" with the solutions it is offering the councils for its collection services.

"Unlike other operators, Onyx does not own a landfill and so has shown the need to refocus its energies on the recycling sector.

"They demonstrated other initiatives, such as tendering high pay scales for their staff which should lead to better staff selection and retention" says Mr Roscoe.

Onyx has the potential to earn additional revenue by selling the recyclables it collects. Onyx CEO Mike Huddleston, says the overseas recycling market becomes much more attractive when you are able collect the larger volumes provided by multiple councils.

"The more recyclables we collect means the more options we have to increase our revenues and add to our bottom line," says Mr Huddleston.

The sheer volume of recycling that will be collected when the trucks hit the streets on 1 July have justified the building of a new recycling sorting facility at Waitakere City Council's Refuse Transfer Station in Henderson, where Onyx will transport all recyclables for future recovery.

Together with the existing refuse transfer station, the new sorting facility - which is expected to employ 11 new staff once it becomes operational next month - will for the first

time enable the cities to closely audit the entire waste stream.

This will give them an accurate picture of what approximately 378,100 people, almost 10 per cent of New Zealand's population, discard every month.

Without the ability to monitor the waste stream, the councils need to rely on commercial waste collectors to tell them what's being collected, many of which financially benefit from increased waste volumes and do not complete waste audits.

A recent memo from the Ministry Environment's senior advisor of sustainable industry, Chris Purchas, states that councils should own or control disposal facilities if they want to succeed with introducing incentives like waste levies. Mr Purchase writes: "where a territorial authority retains ownership or control of disposal facilities, waste levies following the Christchurch model would seem effective." Christchurch City Council has recently implemented a by-law that includes waste licensing fees and levies for its cleanfill operations. They join several hundred other cities, mostly in Europe, which have successfully implemented levies as a means of creating financial incentives for people to reduce rubbish.

Central government proposed a system of national landfill levies to support its National Waste Strategy, but abandoned this in 2003 - a year after Waitakere and North Shore City Councils had started working on combined waste reduction initiatives.



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Biodigester transforms dairy shed waste

An on-farm biodigester that takes dairy shed effluent and converts it to an environmentally safe fertiliser, is being trialled on a Waikato farm.

The single vessel bio-digester is a self-supporting system that processes the manure, and extracts methane gas for energy.

The patented system was developed over the last two decades and involves anaerobic digestion that converts raw manure into a non-toxic, certifiable organic fertiliser. This means that all pathogen germs are destroyed and the basic nutritional ingredients transformed for soil, crop and grass health.

The process makes the manure safe for land-based disposal as a fertiliser for both agricultural and horticultural uses. "It is a break-through in manure disposal, because we can avoid both water and land contamination while producing valuable fertiliser – rather than a sludge which requires further processing for safe disposal into the environment," says Integrated Systems managing director, Roy Harlow.

The bio-digester goes continuously and is completely energy self-supporting. The unit produces 3-phase power at 22-25Kw for seven hours a day on 1400 litres of effluent.

During the off-season the system can operate without loading for up to 10 days and return to full production in 2-3 days. The stainless steel unit is designed to support the bacteria that dismantle the raw manure, transforming and blending it into non-toxic soil and plant foods.

The system serves as a long-term organic fertiliser plant that sustains itself and produces renewable surplus energy.

By converting an agricultural pollutant into an economic asset, it offers an environmentally sustainable solution by processing the manure, generating energy and producing fertiliser.

The system has several potential benefits to operations such as large-scale dairy farms, says John Turner, client services manager for RJ Hill Laboratories.

Digestion of the effluent reduces the total nitrogen content of the effluent, and coliform organisms associated with animal manures do not survive the digestion process.

The system also creates a pH neutral fertiliser which is beneficial to soil micro-organisms.



Northern North Island Zero Waste Bus Tour participants (above), listen to the managing director of Integrated Systems, Roy Harlow, describe the bio-digester processes at a dairy farm near Cambridge recently.

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